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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/678,434	10/03/2003	Zhaozhong Jiang	JJK-0335 (P2002J084)	1597
27810 7590 01/26/2007 ExxonMobil Research & Engineering Company P.O. Box 900 1545 Route 22 East Annandale, NJ 08801-0900			EXAMINER SINGH, PREM C	
			ART UNIT 1764	PAPER NUMBER
SHORTENED STATUTORY PERIOD OF RESPONSE		MAIL DATE	DELIVERY MODE	
3 MONTHS		01/26/2007	PAPER	

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

## Office Action Summary

Application No.

10/678,434

Applicant(s)

JIANG ET AL.

Examiner

Prem C. Singh

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 16 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-7,12 and 13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12 and 13 is/are allowed.
- 6) ☒ Claim(s) 1,2 and 4-7 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 October 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/16/2006 has been entered.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

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4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1, 2, and 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Apelian et al (US Patent 5,976,351).

6. With respect to claim 1, Apelian discloses a process for producing a high viscosity index lubricating oil. The process comprises:

Hydroisomerization (Column 9, line 37)

Catalytically dewaxing waxy paraffins present in the feed by isomerization in the presence of hydrogen and in the presence of a large pore zeolite isomerization catalyst (Abstract), such as zeolite beta, Y, and mordenite along with MCM-22 and possessing at least one Group VIII metal (see column 3, lines 65-67; column 4, lines 1-9); and

Dewaxing (Column 12, line 42)

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Passing the product into a shape-selective catalytic dewaxing process to remove n-paraffins together with waxy slightly branched chain paraffins, while leaving the more branched chain iso-paraffins in the process stream (See column 12, lines 61-65). "The preferred catalysts are intermediate pore zeolites." (Column 13, lines 17-18). "The metal will be preferably platinum or palladium." (Column 14, lines 22-23): The product yields are at least 50 wt% based on the original wax feed (see column 15, lines 55-58), kinematic viscosity at 100°C = 5.47 cSt, pour point = 0°F (-18°C), and viscosity index = 146 (see column 16, lines 59-62).

Although Apelian does not specifically mention about carbon content of the feed, the invention does mention using wax feed. Since wax is a high carbon product, it would have been obvious to one skilled in the art at the time the invention was made to modify Apelian invention and use C<sub>24</sub>-C<sub>110</sub> wax for a high quality lube stock and produce a value-added product from a waste end product.

It is to be noted that Apelian uses molecular sieves like, zeolite beta, Y, mordenite, and MCM-22 in the first step, but does not specifically mention about details of the molecular sieve. Standard texts (for example: Zeolites: The International Journal of Molecular Sieves, 17:1-230, 1996, page 9)) (A copy enclosed) provide channel systems of zeolites. For example: Beta zeolite has 12-Ring structure with 5.5 x 5.5 size and Mordenite has 12-Ring structure with 6.5 x 7.0 size. Both are unidimensional. Also, both have near circular pore structures. Also, the difference between a maximum diameter and a minimum diameter of the molecular sieve is an inherent property of the sieve.

It is also to be noted that Apelian uses zeolite beta in the first step (isomerization) and an intermediate-pore zeolite in the second step (dewaxing). The Applicant uses an intermediate-pore zeolite in the first step and zeolite beta in the second step.

In this regard, Apelian further discloses, "As Example 6 and Figure 4, *infra* illustrate, intermediate pore size molecular sieves such as Pt/ZSM-23 possesses incremental isomerization capabilities in addition to shape-selective dewaxing capabilities." (Column 15, lines 32-35).

Since the intermediate-pore zeolite has isomerization and dewaxing both capabilities, it can be placed either in the first step or in the second step of Apelian invention and thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Apelian invention and change the sequence of catalyst beds, i.e., intermediate pore zeolite (ZSM-23) followed by large pore zeolite (zeolite beta) because the change in sequence will not change the physico-chemical properties of the finished lube stock. See *In Re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (*selection of any order of performing process steps is prima facie obvious in the absence of new or unexpected results*).

7. With respect to claim 2, Apelian discloses, "The feeds include high boiling fractions such as distillates from vacuum distillation of atmospheric residues, raffinates from solvent extraction of such distillate fractions, hydrocracked vacuum distillates and waxes from solvent dewaxing of raffinates and hudrocrackates." (Column 5, lines 3-8).

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Apelian further discloses hydroisomerization conditions as: temperature of 570-780°F (300-415°C) (see column 11, lines 65-66), LHSV = 0.5-2 hr<sup>-1</sup> (see column 12, line 12); dewaxing condition temperature of 482-930° F (250-500°C) (see column 14, line 33), LHSV = 0.2-5 hr<sup>-1</sup> (see column 14, lines 37-38). Hydrogen partial pressure of 800-3000 psig (5516 to 20785 kPa, hydrogen circulation rate = 500-5000 scf/bbl (90-900 nl/l) (see column 12, lines 16-21).

Although Apelian does not specifically mention 1100°F+ fraction in the feed, but since the invention uses vacuum distillates of atmospheric residues as feed, it would have been obvious to one skilled in the art at the time the invention was made to modify Apelian invention and use 1100°F+ fraction as feed to make better use of the otherwise waste residue.

8. With respect to claim 4, Apelian discloses, "Platinum and palladium are given a preference." (Column 11, lines 34-35).

Although Apelian does not use ZSM-48, but uses ZSM-22, ZSM-23, and ZSM-35 as intermediate pore zeolites. Since ZSM-48 is also an intermediate pore zeolite, it is expected to act similar to the zeolites mentioned by Apelian, and therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify Apelian invention and use zeolite-48 because it is expected to provide similar performance as other zeolites of intermediate pore structure. See *In Re Ruff*, 256 F.2d 590, 118 USPQ 340 (CCPA 1958).

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It is to be noted that although Apelian does not specifically mention about the alpha value of ZSM catalysts, the value is an inherent property of the zeolite(s).

9. With respect to claim 5, Apelian discloses the use of waxes as feed (see column 5, lines 64-65) but does not specifically mention about high temperature tail. As discussed under claim 2, it would have been obvious to use a 1100°F+ feed and therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify Apelian invention and use wax feeds with 1000°F+ high temperature tail for making better use of high boiling residual waxy stocks.

Apelian also discloses, "The metal will be preferably platinum or palladium in the amount of 0.1 to 10 wt%." (Column 14, lines 22-24).

Apelian further discloses, "The catalyst should have an alpha value below 30 prior to metal addition." (Column 9, lines 58-59).

Apelian adds, "The amount of the noble metal hydrogenation component is typically in the range of 0.1 to 5 wt% of the total catalyst." (Column 11, lines 35-37).

Apelian also discloses, "Platinum and palladium are given a preference." (Column 11, lines 34-35).

10. With respect to claims 6 and 7, Apelian discloses using Pt/ZSM-23 and Pt/beta catalysts as discussed under claims 1, 2, 4, and 5. Also changing the sequence of catalysts with large pore and intermediate pore zeolites is obvious as discussed under claim 1.

Regarding the two catalysts in a cascaded two-bed system, the invention discloses, "Hydrogen may be used as an inter-bed quench in order to provide maximum temperature control in the reactor. Example 6 and figure 4, infra illustrate the effectiveness of employing ZSM-23 in combination with zeolite beta in an integrated catalyst system. Pt/ZSM-23, although primarily a shape selective catalyst, adds incremental isomerization capability." (Column 14, lines 42-48). Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify Apelian invention and use Pt/ZSM-48 and Pt/beta catalysts in a cascade system for a compact arrangement of catalysts in a single reactor to produce high quality lube stock. It is to be noted that ZSM-48 is functionally similar to ZSM-23 as discussed under claim 4.

#### ***Allowable Subject Matter***

11. Claims 12 and 13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
12. The following is a statement of reasons for the indication of allowable subject matter:

A process of hydroisomerization and dewaxing a waxy feed as claimed, using large pore and medium pore zeolites to produce isoparaffinic lube base stock with a

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viscosity index of at least 150 at  $-20^{\circ}\text{C}$  pour point and a viscosity index of at least 130 at a pour point of no more than  $-50^{\circ}\text{C}$  is not disclosed or fairly suggested in the prior art.

### ***Response to Arguments***

13. Applicant's arguments regarding Yen are moot because that reference has not been used in the present Office action.

14. The Applicant's argument on Apelian and '788 reference mentioning that the references do not teach or suggest a process for producing lube base oils having a pour point between  $-9$  and  $-54^{\circ}\text{C}$ , corresponding VI's between 165 and 136, and corresponding kinematic viscosities between 6 and 5 cSt, the respective base oils being produced in yields between about 60 wt% and 20 wt% based on the waxy feed by processing a  $\text{C}_{24} - \text{C}_{110}$  waxy feed first over a Group VIII metal loaded intermediate pore zeolite to produce an intermediate product which is then processed over a Group VIII metal loaded zeolite B catalyst, is persuasive and therefore, rejection of claims 12 and 13 has been withdrawn.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Prem C. Singh whose telephone number is 571-272-6381. The examiner can normally be reached on MF 8-5.

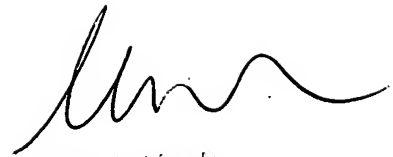
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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A handwritten signature in black ink, appearing to read 'Glenin Caldarola', with a stylized, flowing script.

Glenin Caldarola  
Supervisory Patent Examiner  
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